

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

REC'D 30 MAY 2005

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## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (day/month/year) **27 MAY 2005**

Applicant's or agent's file reference

**FOR FURTHER ACTION**

See paragraph 2 below

11-018 PCT

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/IL04/01110

07 December 2004 (07.12.2004)

22 October 2004 (22.10.2004)

International Patent Classification (IPC) or both national classification and IPC

IPC(7): B01D 65/08 and US Cl.: 210/636

Applicant

BEN-GURION UNIVERSITY OF THE NEGEV RESEARCH AND DE

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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Form PCT/ISA/237 (cover sheet) (January 2004)

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IL04/01110

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IL04/01110

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 14-17

because:

☐ the said international application, or the said claim Nos. \_\_\_\_\_ relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 14-17 are so unclear that no meaningful opinion could be formed (*specify*):

Claims 14-17 will not be examined under PCT Rule 6.4(a) because they are multiple dependent claims which improperly are dependent upon at least one other multiple dependent claim.

☐ the claims, or said claims Nos. \_\_\_\_\_ are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for said claims Nos. \_\_\_\_\_

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐

has not been furnished

☐

does not comply with the standard

the computer readable form

☐

has not been furnished

☐

does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See Supplemental Box for further details.

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/IL04/01110

**Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims <u>1-13</u>	YES
	Claims <u>NONE</u>	NO
Inventive step (IS)	Claims <u>9</u>	YES
	Claims <u>1-8 AND 10-13</u>	NO
Industrial applicability (IA)	Claims <u>1-13</u>	YES
	Claims <u>NONE</u>	NO

**2. Citations and explanations:**

Claims 1-8 and 10-13 lack an inventive step under PCT Article 33(3) as being obvious over Lauer patent 5,690,829 in view of Haney patent 6,099,733. Lauer discloses water being purified by a membrane, to remove sparingly soluble salts (column 3, line 65) and minerals (dirt particles-column 2, line 22), utilizing apparatus components comprising pressure vessel 2 housing one or more membranes 4, pump (inferred by column 6, lines 27-28 "driving force"), valves including valves on feed and concentrate lines (column 6, lines 56-65 and column 7, lines 38-44), direction of flow being reversed using the valves to periodically remove the salts and minerals from membrane surfaces to prevent precipitation (column 7, lines 50-55).

Independent claims 1, 10 and 12 and all the claims all differ in requiring the reversal of flow to be controlled by a controller. However to have modified the process or apparatus of Lauer to encompass such controller would not constitute inventive step since Haney teaches such controller to control timing and duration of reversal of flow to backwash membranes at column 14, lines 53-63, column 15, lines 43-49, column 38, line 66-column 39, line 12 so as to optimize timing and duration of backwashing dependent upon changeable factors of feed stream content and changeable conditions regarding deposition of material onto the membranes.

For claims 2, 11 and 13, Haney also teaches control of flow direction in effecting backwashing by pressure sensors at column 13, lines 52-53, calculation of salt/mineral concentrations (column 15, line 48 and column 16, lines 8-10 and factoring of the concentrations to determine timing of backwashing at column 5, lines 42-54.

Regarding claim 5, see Lauer at column 3, lines 35-36 "time intervals".

Regarding claim 6, since Lauer removes particles of dirt, silica and mineral salts are inherently removed, since they are constituents of dirt.

Regarding claim 7, see periodic reduction of flow rates through the membranes at column 3, lines 42-43.

Regarding claim 8, chemicals such as antiscalants are added by Lauer at column 8, lines 28-29.

Claim 9 meets the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a process for purifying water containing soluble salts and minerals in a pressurized treatment zone by membranes in which flow through the membranes is periodically reversed to prevent supersaturation conditions causing precipitation of salts and/or minerals onto the membranes and in which the concentrate is further treated by being directed into a crystallizer and then the salts and/or minerals are precipitated therein with solids and liquids being separated.

Claims 1-13 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in the water treatment and ocean water desalination industry.